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ABSTRACT

A study presents a perceptual model of thinking called the "Six Thinking Hats" and argumentativeness as a predictor of response to the model. The "Six Thinking Hats" model creates six artificial contexts for thinking, corresponding to the primary thought modes of objective, subjective, critical, and creative thinking, within a comprehensive framework that allows the thinker to direct attention to the desired thinking mode. Argumentativeness is conceptualized as a generally stable trait which predisposes the individual in communication situations to advocate positions on controversial issues and to refute the positions which other people take on these issues. Subjects, 31 students at Rochester Institute of Technology in a graduate school management class, were trained to use the "Six Thinking Hats" model and completed survey instruments. Argumentativeness was not found to be a useful predictor of response to the "Six Thinking Hats" model for the individual thought modes, but broaches intriguing questions for future study within the fields of thinking and communication. (Contains 11 references and 3 notes. Appendixes present a detailed description of the introduction, training, thinking exercise, and surveys associated with the Six Thinking Hats model; and 2 tables of data.) (Author/RS)

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Six Thinking Hats:

Argumentativeness and Response to Thinking Model

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Abstract

This study presents a perceptual model of thinking called the "Six Thinking Hats" and argumentativeness as a predictor of response to the model. The "Six Thinking Hats" model creates six artificial contexts for thinking, corresponding to the primary thought modes of objective, subjective, critical, and creative thinking, within a comprehensive framework that allows the thinker to direct attention to the desired thinking mode. Argumentativeness is conceptualized as a generally stable trait which predisposes the individual in communication situations to advocate positions on controversial issues and to refute the positions which other people take on these issues.

Argumentativeness was not found to be a useful predictor of response to the "Six Thinking Hats" model nor the individual thought modes, but broaches intriguing questions for future study within the fields of thinking and communication.

Introduction

Thinking can be a complex and confusing activity. Facts and figures seem to conflict with feelings and intuition; playing "devil's advocate" can overshadow "looking on the bright side of things"; relying on an argumentative style of attacking another's positions and defending one's own is often detrimental to generating creative responses to situations.

In response to these thinking challenges, Edward de Bono, regarded as the leading international authority in the field of conceptual thinking and also the direct teaching of thinking as a skill, created a useful model of thinking called the "Six Thinking Hats." De Bono begins by distinguishing six modes of thinking, each identified with six colored hats:

White Hat - facts, figures, and objective information

Red Hat - emotions, feelings, hunches, intuition

Black Hat - logical negative thoughts, "devil's advocate," why something will not work

Yellow Hat - logical constructive thoughts, positive aspects of why something will work

Green Hat - creativity, generating new ideas, provocative thoughts, lateral thinking

Blue Hat - control of the other hats, thinking about the thinking process, directs attention to other hats to facilitate "mapmaking" thinking.

The six hats do not cover all aspects of thinking, but they do cover the main modes (de Bono, 1985).

De Bono uses the thinking "hat" metaphor because of familiar expressions such as "put on your thinking cap (hat)." The hat is a tangible object that one can literally wear or that one can visualize putting on or taking off. "Putting on" a hat is a deliberate process that switches the thinker's attention exclusively to that mode, thus simplifying the thinking process; "switching" hats redirects thinking to another mode. The artificiality of the hats is their greatest value; they provide a formal and convenient way to request a certain type of thinking from oneself or others (de Bono, 1985)[1].

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[1] Although the model may appear "gimmicky," the novelty of the model is useful to construct a new metaphor for thinking models that distinguishes it from earlier models that emphasize highly argumentative thinking processes.

Only one hat is worn at a time so that it is clear what type of thinking is being used. However, there may be a great deal of overlap among the hats and it is not necessary to be dogmatic about the use of one hat over another. One does not need to "put on" or "switch" hats at every moment, although it is important to make a conscious effort to think in the specific mode when it is identified (de Bono, 1985).

The deliberate process of putting on a hat allows the thinker to role play thinking in that mode. For example, one who physically or mentally assumes the pose of Rodin's "The Thinker" perceives oneself as being a thinker (de Bono, 1985). Similarly, putting on the green hat focuses one's attention on creative, generative thinking and thus facilitates thinking in that mode. The thinker plays this role to the best of his or her ability. This role playing reduces the ego-involvement of the thinker. For example, a person who wants to act as a clown will experience greater freedom to do so when dressed in a clown suit rather than a business suit; the act of putting on the clown suit facilitates an environment for being a clown, while a suit at a business meeting creates a useful, but inappropriate, context. The deliberate action of wearing the six hats creates useful contexts to be free to think in the mode of feelings and emotions (red hat), critical thinking (black and yellow hat), creative thinking (green hat), objective thinking (white hat), thinking about the thinking process itself and to coordinate the other modes (blue hat).

The use of the different hats facilitates a "mapmaking" thinking process, which is an alternative to an "argument" style. The "mapmaking" process is a deliberate, broad exploration of the subject. The following analogy illustrates the "mapmaking process": a color map is printed one color layer at a time. As all the color layers are added, a map is formed. Once the map is finished, one can view all route alternatives and decide the best direction to take. In the same way, a person can make a thinking "map" by putting on and switching among each of the six colored thinking hats. After all the hats are used in a systematic manner to contribute to making the map, the person can decide on a route to take. Thus, thinking becomes a two-stage process: 1) making the map, 2) choosing a route on the map. If the map is sufficiently precise and accurate, the route often becomes obvious.

The traditional "argument" thinking style is central to many Western institutions such as "law, politics, and scientific progress" (de Bono, 1990, 272). This type of thinking focuses almost solely on the "black hat" mode and can be destructive if used exclusively because: 1) argument concentrates on proving the opposing case to be false, while 2) disregarding certain data or evidence if it is detrimental to one's own case; 3) argument lends itself to heavy ego-involvement and tends to cause people holding conflicting viewpoints to adopt adversarial postures; 4) perspectives are often polarized into us/them and right/wrong; 5) time is focused on attack and defense of positions which often leads to win/lose situations, rather than constructing creative win/win alternatives (de Bono, 1990).

In summary, the value of De Bono's "Six Thinking Hats" model is three-fold. First, it identifies confusion as the biggest thinking deficiency. Emotions, logic, information, hope, and creativity scramble together to overwhelm the thinker. The six hats unscramble this disarray by differentiating the various thought modes, thus permitting the thinker to use each mode one at a time. The thinker can direct her own attention to a different thinking mode by switching hats. Second, by wearing or visualizing a hat, a person can role play thinking in that mode, thus reducing detrimental ego-involvement. Third, the use of all six hats does not limit the thinker to an "argument" thinking style, but facilitates a more comprehensive "mapmaking" style. This two-stage process begins by making the map and concludes by choosing the most appropriate route (de Bono, 1985).

Research Questions

This study focuses on one's response to the "Six Thinking Hats" model and its relationship to trait argumentativeness. It investigates the following research questions:

- What is the relationship between a person's argumentative level (low, moderate, high) and their response to using each of the six different hats?
- What is the relationship between a person's argumentative level (low, moderate, high) and their response to utilizing the "Six Thinking Hats" model?
- What differences exist among argumentative level (low, moderate, high) and response to the "Six Thinking Hats" model and the individual hats?

For each of the above research questions, "response" is operationalized by the following self-reported variables (applied for both responses to each of the six hats and the model as a whole):

- Affective level: like/dislike using the model/hat
- Comfort level: comfortable/uncomfortable using the model/hat
- Importance: how important/unimportant the model/hat was to effective thinking
- Satisfaction: satisfied/unsatisfied with use of the model/hat
- Helpfulness: how helpful/unhelpful that model/hat was for effective thinking
- Confusion: how confused/clear about the purpose of the model/hat
- Perceived Effectiveness: how effective/ineffective the person thought she was using the model/hat
- Desire to Use Again (for model only): how much/little desire the person had to use the model again in the future

The above variables combine to form an "aggregate response variable"; the first seven variables for each of the individual hats will be combined for six different "aggregate response variables" corresponding to *each of the six different hats*, and all eight of the above variables will be combined for the *model* "aggregate response variable."

Rationale

Personal

I have used de Bono's thinking model to develop my own thinking skills and have found it very useful. I am especially interested in the use of "mapmaking" thinking and its relationship to communication. This is the first model of thinking of which I am aware that provides a useful, simple structure to incorporate feelings, intuitions, and creative processes along with the more traditionally valued objective and critical thinking modes.

Scholarly

The study of thinking is multi-disciplinary; philosophy, psychology, and communication all benefit from understanding more about the brain and the thinking process. It is useful to study thinking as it relates to communication, specifically how thinking as intrapersonal communication and cognitive psychology relate to interpersonal and group communication. The "Six Thinking Hats" provides a comprehensive model for thinking. The "mapmaking" style facilitates exploratory thinking and may provide a valuable alternative to supporting and defending a position through argument and debate, a style traditionally supported in academia.

If it can be shown that a person responds differently to the model or any of the hats based on their argumentative level, then argumentativeness could have predictive value in determining one's response to the model and the six hats.

Social

De Bono's model of thinking and creativity has been used in an organizational environment in recent years, specifically focusing on management and group work (de Bono, 1985). A "Six Thinking Hats" method has been specifically designed for use in education; in Venezuela, de Bono's thinking methods are part of the mandatory school curriculum (de Bono, 1985). The "mapmaking" style facilitates exploratory thinking and may provide a valuable (i.e., constructive, generative, and more comprehensive) alternative to the legal system and other social systems which rely heavily on the traditional Western notions of argument and debate to arrive at the "truth."

Review of Literature

The "Six Thinking Hats" model and the "mapmaking" style of thinking it facilitates extends from de Bono's perceptual model of how the brain works. His model has been computer simulated and shown to behave as predicted[2] (Lee & Marudarajan, 1982). According to de Bono, the brain is an active (self-organizing) patterning system. A simple illustration of this is rain falling onto a virgin landscape. Over time, the rainwater forms itself into streams and then rivers, thus altering the landscape. There is interaction between the rain and the landscape; both are active. Future rainfall will flow along the channels that have been established (de Bono, 1990).

This can be contrasted with a "passive" system in which pieces, symbols, or information are recorded and stored on some surface. The information does not change on the surface; the surface does not change. The information is manipulated by some outside operator according to certain rules. To illustrate this, imagine chess pieces sitting passively on a chess board until the chess player moves the pieces around according to the rules of chess (de Bono, 1990).

Passive systems record only place or shape on a surface. This place or shape has meaning because it refers to a pre-defined situation. In contrast, an active system records place, time, sequence, and context. All of these determine how patterns form and which things link together (de Bono, 1990).

Two important characteristics of this model are context and attention. De Bono (1990) explains that "the actual patterns that emerge are determined by history, by activity at the moment, and also by context which sets the background readiness level of different patterns" (79). Furthermore, he adds, there is unitary attention which may take in the whole field of awareness or focus on part of it, while ignoring the rest.

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2 Lee and Marudarajan characterized de Bono's model as a "highly speculative brain model" and aimed to formalize it. They concluded that more experiments will help understand its actual rather than speculative behavior, and that they "do not justify the system either as a brain model or as a psychological model" (Lee & Marudarajan, 1982, 190).

De Bono developed the "Six Thinking Hats" model based directly on this perceptual model. The six hats set up six artificial contexts for thinking which can be put on or removed, metaphorically (de Bono, 1990). The switching of the hats directs the attention to another mode of thinking. The artificial contexts and attention act similarly to buying a new car and subsequently noticing how many people have similar cars. By buying the car, an artificial context was created which prepares the mind to direct attention to that context, thus becoming more aware of the similar cars. In the same way, putting on the green hat creates the context for, and directs attention to, creative thinking.

To further illustrate the importance of directing attention to one hat at a time and incorporating all of the primary thought modes, there is some evidence that different chemicals are released when attention is directed to thinking in different modes (de Bono, 1990). To obtain optimal brain chemistry, it is necessary to be able to differentiate the six modes, and to direct attention to them one at a time.

Two of the primary modes that the six hats model incorporates are the critical and the creative modes. Bleedorn (1993) writes, "Dynamic, global changes in human affairs require creative and critical thinking directed toward new, more complex thought patterns and collective behavior" (10). He continues, "Urgent arguments for the deliberate teaching of processes of both creative and critical thinking have centered around the reality of new complexities in the transition to a global society" (10).

Isaksen and Murdock (1988) explored the development of creativity and concluded that the fields of education, business, and management, recognize the need for integrating creative, critical, and higher-level thinking skills. Critical thinking has been primarily taught through college philosophy courses based on Aristotelian logic and deductive reasoning (Bleedorn, 1993). Creativity has not been traditionally emphasized, but is becoming its own academic discipline led by such researchers as Amabile (1983), Sternberg (1988), and Gardner (1985). Although the historical development of creative and critical thinking may cause them to be perceived as separate and distinct processes, "their most effective applications are exemplars of highly integrated, dialectical thought" (Bleedorn, 1993, 10).

The historical emphasis on critical thought has traditionally placed high value on argument and argumentation across many segments of society and institutions. In communication research, argumentativeness has been conceptualized by Infante & Rancer (1982) as "a generally stable trait which predisposes the individual in communication situations to advocate positions on controversial issues and to attack verbally the positions which other people take on these issues" (72). Argumentativeness enables a person to recognize controversial issues, to present position on the issues, and to attempt refutations of other's positions (Infante & Rancer, 1982). Infante and Rancer (1982) constructed an argumentativeness scale[3] (1982) based on an approach-avoidance model to assess argumentativeness. This model posits that a highly argumentative person experiences favorable excitement and has a strong tendency to approach arguments, while feeling no inhibition to argue nor tendencies to avoid arguments; the low argumentative is the opposite (Infante & Rancer, 1982). The argumentative trait is thus seen as the interaction of the tendency to approach arguments and the tendency to avoid arguments (Infante & Rancer, 1982).

Rancer and Infante (1985) found that responses to a given argument encounter are better predicted and explained by an "interactionist" perspective; this perspective takes into account trait argumentativeness issues and the context of the situation which includes such factors as the nature of the issue, characteristics of the "opponent," and perceptions of the situation. This interactionist view suggests that, depending on the contextual factors, a high argumentative person will sometimes choose to avoid arguing, while a low argumentative person may be more likely to argue (Stewart & Roach, 1993).

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3 See Appendix A for argumentativeness scale.

Research Methods[4]

Participants (N=31) in this study were Rochester Institute of Technology (RIT) students in a graduate school management class in RIT's College of Business. The study was conducted in two phases.

Phase 1: The participants were administered Infante and Rancer's argumentativeness scale; this scale has been found to be both valid and reliable (Infante & Rancer, 1982). The surveys were coded by the last four digits of their phone number to be later matched with a second survey administered in Phase 2 (both surveys were pretested showing that directions and layout of the questions were clear). The faculty member introduced the researcher to the class and provided a brief overview of both phases of the study.

Phase 2: One week later, the researcher attended the class to train the participants how to use the "Six Thinking Hats" model. During the training session, the students were allowed to ask questions clarifying the use of the six hats. Following this training, the students applied the "Six Thinking Hats" model to a thinking exercise designed by the researcher and the graduate faculty member to be interesting and appropriate for the class. Lastly, the students were administered a second survey regarding their response to using each of the different hats and the "Six Thinking Hats" model. The survey was testing the following self-reported variables (applied for both responses to each of the six hats and the model as a whole):

- Affective level: like/dislike using the model/hat
- Comfort level: comfortable/uncomfortable using the model/hat
- Importance: how important/unimportant the model/hat was to effective thinking
- Satisfaction: satisfied/unsatisfied with use of the model/hat
- Helpfulness: how helpful/unhelpful that model/hat was for effective thinking
- Confusion: how confused/clear about the purpose of the model/hat

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4 Refer to Appendix A for detailed description of the introduction, training, thinking exercise, and surveys.

- Perceived Effectiveness: how effective/ineffective the person thought she was using the model/hat
- Desire to Use Again (for model only): how much/little desire the person had to use the model again in the future

These variables were chosen because they were felt to incorporate the primary ways a person responds to something to which they were just introduced. The variables were combined to form an "aggregate response variable"; the first seven variables for each of the individual hats will be combined for six different "aggregate response variables" corresponding to *each of the six different hats,* and all eight of the above variables will be combined for the *model* "aggregate response variable."

The data from the Argumentativeness Scale was coded into low, moderate, and high argumentative levels. A series of correlation tests and ANOVA tests were run to determine any significant relationships existing between the three argumentative levels and the aggregate response variables for the model and the six different hats.

Results and Discussion

An analysis of the mean scores (N=31) for responses to the "Six Thinking Hats" model reveal no strong positive nor negative feelings towards the model or to any of the hats. Utilizing a 5-point Likert scale, the average of the mean scores for all of the response variables to the model and the hats was 2.85 (3.00 represents "Neither Agree nor Disagree"). The strongest responses were given to the importance of the white hat (objective facts and figures) for effective thinking (3.871) and that 42.3% of the participants reported that the white hat was their favorite thinking style.

Participant's responses to the argumentative scale (Infante & Rancer, 1982) were scored and were assigned a code of low, moderate, and high argumentativeness (ARG) according to levels recommended by the creators of the instrument (Infante & Rancer, 1982). The scores (N=31) were normally distributed, skewing slightly towards the left (low ARG); 6 were coded as low ARG, 19 as moderate ARG, and 6 as high ARG.

To answer the first two research questions, "what is the relationship between a person's argumentative level (low, moderate, high) and their response to using each of the six different hats?" and "what is the relationship between a person's argumentative level and their response to utilizing the 'Six Thinking Hats' model?", the data were analyzed with Spearman's Rho measure of correlation. The strongest correlation (.363) was in response to the participants being clear about the purpose of the blue hat (the "master" hat which directs attention to the other hats, "thinks" about the thinking process). The other correlations ranged from -.0226 to .248[5].

The third research question, "what differences exist among argumentative level (low. moderate, high) and response to the 'Six Thinking Hats' model and hats" was answered using an oneway analysis of variance (ANOVA). Although the data were ordinal level and not the required interval level data for an ANOVA, the survey response options were labeled with a 5-point Likert scale giving the impression to the participant that there was a 1:1 relationship among the response options. The p-values for ANOVAs ranged from .024 to .995[6]; the only significant variable was that the participants were clear about the purpose of the blue hat.

The response to the six hats and the model in general was indifferent; that is, the participants had no strong feelings towards the model either positively or negatively. This could be because participants were actually indifferent to the model and each of the hats (although response to the white hat was noticeably more positive), but could also have been influenced strongly due to the design and research methods of the experiment. For example, the respondents were asked to respond to the "Six Thinking Hats" survey based on their feelings during the thinking exercise. The way the question was phrased on the thinking exercise ("How can the RIT's College of Business increase its enrollment?") was vague and required the participant to come up with ideas about how the College could do this and then evaluate their own ideas. Three respondents wrote on their surveys that the kind of question used

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5 Please refer to Appendix B for a table of all correlations.

6 Please refer to Appendix B for a table of all ANOVA p-values.

during the training session ("Should I take new job in Seattle?") might have been more appropriate to use for the thinking exercise because it was more specific in asking whether or not to do something while requiring less effort to generate their own ideas to evaluate. Also, participants noted on their survey that they felt extremely rushed during the training session, the thinking exercise, and while filling out the surveys (the class was under strenuous time constraints as there were two class presentations and the previous week's test to hand back and discuss).

The correlations and the ANOVAs showed consistently weak correlations and only one significant variable. This suggests that ARG level is not a useful predictor of a person's response to the Six Thinking Hats" model or hats, nor is there much utility in relating ARG level to one's response to the model or hats.

It may be useful to consider an interactionist perspective to further explain the results of this study. The interactionist perspective takes into account trait argumentativeness issues and the context of the situation which includes such factors as the nature of the issue, characteristics of the "opponent," and perceptions of the situation. The interactionist view suggests that the context may not have been appropriate for there to be any significant differences among the different ARG levels. For example, there may have been very limited involvement with the thinking exercise, especially the College of Business enrollment question. Furthermore, the argumentativeness scale measures trait argumentativeness in relation to a controversial issue. The six hats were not presented in this context during the training session nor the thinking exercise. Also, the participant's perceptions of the situation may have had a high degree of variance and influenced their responses to the model and the hats.

Conclusion

Summary

This study sought to discover the relationship of argumentativeness level and responses to the "Six Thinking Hats" thinking model. Argumentativeness is the trait to advocate positions on controversial issues and attempting to refute the positions which other people take on those issues. The "Six Thinking Hats" model creates a framework for thinking that incorporates our primary thought modes (objective, subjective, critical, and creative).

The responses to the model and the individual hats were generally indifferent and the data suggested no significant relationships between argumentativeness level and response to the model.

Limitations

This study was limited by the following conditions:

- the research environment and training session for the use of the hats was unsatisfactory due to time constraints;
- the thinking exercise may have been too vague and limited to provide enough exposure and familiarity with the model to allow for participants to form an opinion;
- the sample size was small and not randomly selected - in addition, the data for two participants were not able to be used because of duplicate phone numbers; the data for six participants could not be used because they were not present for both the argumentativeness scale and the six hat response survey;
- only one model of thinking was being tested; participants perceptions about the structure of models of thinking in general were not taken into consideration (i.e., some may have felt that any model of thinking is not useful because it is too structured).

Heuristic Aspects

Research could be extended into the area of small group communication. The "Six Thinking Hats" model was originally designed to be used in a small group context has been shown to have great value, especially in corporate America. The hats may reduce negative ego-involvement during controversial discussions, may increase participation within the groups, and change group member's perceptions of a leader (this would be because all group participants have access to any of the hats, especially the blue hat - the hat most closely related to characteristics of a group leader).

De Bono indicates that there may be changes in chemicals that are released while one's attention is directed to thinking in different modes. Further research in this area may allow better description of the different thinking modes.

Another study may ask the question about how different thinking models, other than the six hats model, relate to argumentative level. Additionally, another study could determine any differences between people who do not like structured models of thinking and would prefer to think with less structure (i.e., "on their feet").

We can now pursue questions regarding differences in "mapmaking" and "argumentative" thinking, such as what thinking modes are used in each, is there a better "style" to use in different contexts, and what are the descriptive characteristics of each.

Thinking is an essential human activity. The "Six Thinking Hats" model can be applied effectively when comprehensive and creative responses to situations are needed. De Bono (1985) states, "Thinking is the ultimate human resource. Yet we can never be satisfied with our most important skill. No matter how good we become, we should always want to be better" (cover).

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Appendix A

The following is a detailed description of this two-phase study as presented to the graduate school business class:

Phase 1 - Introduction to Study, Argumentativeness Scale

The graduate school business class was a Strategy & Policy night course at RIT's College of Business. The class met in a traditional classroom (i.e., students seated by rows with chalkboard at front of room). The class met from 6 pm - 9 pm every Tuesday night during the Winter quarter.

The instructor introduced me to the class as a fourth year Professional & Technical Communication student in the College of Liberal Arts at RIT. He then provided an overview of my senior thesis project on thinking models. I administered the argumentativeness scale. The class completed them within five minutes. I collected the surveys and said I would be back two weeks later for the second phase.

Phase 2 - Introduction to "Six Thinking Hats" model, Thinking Exercise, Response Survey

Two weeks later, I returned to the class to present "Phase 2" of the study. The environment to conduct the second phase could not be described as optimal. My presentation had to be "squeezed" into the class' busy agenda. This resulted in a rushed atmosphere while I presented the introduction to the model, and while the students were completing the thinking exercise and survey.

The instructor again introduced me to the class and explained what I would do in the next 30 minutes. He talked briefly about the value of a thinking model to strategy and the student's careers. He then yielded the stage to me.

Six Thinking Hat Introduction [Time: 10 minutes]

I thanked them in advance for their time and involvement they were devoting to my study. I then talked about the value of thinking to strategy and policy (I was enrolled in the instructor's undergraduate Strategy & Policy class at the same time). After re-stating what would happen in the next 30 minutes, I introduced the "Six Thinking Hats" model by explaining its purpose and the role of the six different hats. I then provided an example of how to run though a thinking exercise applying this model. I concluded by asking if there were any questions; no questions were asked.

Thinking Exercise [Time: 10 minutes]

I distributed the thinking exercise packet and explained that this exercise was developed by the instructor and myself to relate to their business major. I emphasized that this was not a test and that its purpose was to gain familiarity with the model and with the six different hats. After they completed the exercise, I asked them to tear off the first two pages of the packet and then collected the last three pages (see packet).

Response Survey [Time: 5 minutes]

I distributed the response survey and explained that this was a way to get their open and honest feedback about the thinking exercise they just went through. I also told them that they would receive a summary of their results if they desired. I collected the completed surveys, thanked them again for their time, and then responded to a few questions the instructor and the class had about the application of this model to their careers.

Last 4 digits of your phone number _____

Instructions: Printed below are a series of statements about your feelings when you are *arguing controversial issues*. This information will be used in a larger study occurring at the Institute. Please indicate how often each statement is true for you personally by *circling* the appropriate category to the right of each statement. Going from left to right means the more often the statement is true. Remember, consider each item in terms of *arguing controversial issues*.

1. While in an argument, I worry that the person I am arguing with will form a negative impression of me.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
2. Arguing over controversial issues improves my intelligence.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
3. I enjoy avoiding arguments.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
4. I am energetic and enthusiastic when I argue.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
5. Once I finish an argument I promise myself that I will not get into another.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
6. Arguing with a person creates more problems for me than it solves.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE

7. I have a pleasant, good feeling when I win a point in an argument.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
8. When I finish arguing with someone I feel nervous and upset.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
9. I enjoy a good argument over a controversial issue.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
10. I get an unpleasant feeling when I realize I am about to get into an argument.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
11. I enjoy defending my point of view on an issue.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
12. I am happy when I keep an argument from happening.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
13. I do not like to miss the opportunity to argue a controversial issue.....	ALMOST NEVER TRUE	RARELY TRUE	OCCASIONALLY TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE

14. I prefer being with people who rarely disagree with me..... ALMOST NEVER TRUE | RARELY TRUE | OCCASIONALLY TRUE | OFTEN TRUE | ALMOST ALWAYS TRUE

15. I consider an argument an exciting challenge..... ALMOST NEVER TRUE | RARELY TRUE | OCCASIONALLY TRUE | OFTEN TRUE | ALMOST ALWAYS TRUE

16. I find myself unable to think of effective points during an argument..... ALMOST NEVER TRUE | RARELY TRUE | OCCASIONALLY TRUE | OFTEN TRUE | ALMOST ALWAYS TRUE

17. I feel refreshed and satisfied after an argument on a controversial issue..... ALMOST NEVER TRUE | RARELY TRUE | OCCASIONALLY TRUE | OFTEN TRUE | ALMOST ALWAYS TRUE

18. I have the ability to do well in an argument..... ALMOST NEVER TRUE | RARELY TRUE | OCCASIONALLY TRUE | OFTEN TRUE | ALMOST ALWAYS TRUE

19. I try to avoid getting into arguments..... ALMOST NEVER TRUE | RARELY TRUE | OCCASIONALLY TRUE | OFTEN TRUE | ALMOST ALWAYS TRUE

20. I feel excitement when I expect that a conversation I am in is leading to an argument..... ALMOST NEVER TRUE | RARELY TRUE | OCCASIONALLY TRUE | OFTEN TRUE | ALMOST ALWAYS TRUE

Six Thinking Hats: An Introduction

Importance of Thinking

Thinking is the ultimate human resource.

- Edward de Bono

The main difficulty of thinking is confusion. We try to do too much at once. Emotions, logic, hope, and creativity all crowd in on us. It is like juggling with too many balls. [The six thinking hats model] is a very simple concept which allows a thinker to do one thing at a time.

- Edward de Bono

Overview of
6 Thinking Hats Model

What it does:

- focuses thinking more clearly
- leads to more creative thinking
- improves communication and decision-making
- incorporates main thinking modes

The Hats

White hat

Used to think about facts, figures, and other objective information
Suggested "mental picture": Scientist's white lab smock

Red hat

Used to elicit your feelings, emotions, hunches, and intuition
Suggested "mental picture": A red heart

Yellow hat

Used to obtain the positive outlook; sees opportunities, possibilities, and benefits
Suggested "mental picture": The warm sun

Black hat

Used to discover why some idea will *not* work; this hat encourages a logical, negative approach
Suggested "mental picture": A devil's advocate or a judge robed in black

Green hat

Used to find creative new ideas
Suggested "mental picture": New grass sprouting up from the ground

Blue hat

Used as a master hat to direct the thinking process
Suggested "mental picture": The overarching sky (in Florida) or an orchestra conductor

Example: Using the Six Hats Model

Should I take new job in Seattle?

White Hat Yellow Hat Green Hat

Red Hat Black Hat Blue Hat

Example: Using the Six Hats Model

Should I take new job in Seattle?

White Hat

How much does this job pay?
What are the benefits like?
Will I need to commute?
I can find out this information during the interview.

Yellow Hat

Working with the industry leader.
Opportunity for promotion.
Job fits with my career goals.

Green Hat

Look for another job.
Take this time to further my education.
Start my own business.

Red Hat

I feel stuck in my present job.
I've always wanted to work for this company.
I like the people at my present job.

Black Hat

I will need to move.
I will be getting promoted next month in my current job.
I will be far away from home.

Blue Hat

It looks like the advantages outweigh the disadvantages. I will make my decision after the interview.

Six Thinking Hats: Thinking Exercise

The Six Thinking Hats: A Summary

The "Six Thinking Hats" model helps to clear up the confusion that occurs when emotions, logic, information, creativity, etc. compete simultaneously for your attention. The six hats represent these different modes of thoughts. "Putting on" a hat directs your attention to thinking in that mode. When a different kind of thinking is called for, you can use another mode by "switching" hats. It sometimes helps to use a "mental picture" to get your mind ready to think in a particular mode. Here are the six hats and the kind of thinking each represents:

White hat

Used to think about facts, figures, and other objective information
Suggested "mental picture": Scientist's white lab smock

Red hat

Used to elicit your feelings, emotions, hunches, and intuition
Suggested "mental picture": A red heart

Yellow hat

Used to obtain the positive outlook; sees opportunities, possibilities, and benefits
Suggested "mental picture": The warm sun

Black hat

Used to discover why some idea will *not* work; this hat encourages a logical, negative approach
Suggested "mental picture": A devil's advocate or a judge robed in black

Green hat

Used to find creative new ideas
Suggested "mental picture": New grass sprouting up from the ground

Blue hat

Used as a master hat to direct the thinking process
Suggested "mental picture": The overarching sky (in Florida) or an orchestra conductor

Thinking Exercise:
Using the Six Hats

1. Select a problem or issue on which you need to think about or make a decision based on the facts, your feelings, what may happen in the future, something you want to see in a different way, etc. Express what you would like to accomplish in this thinking exercise. For this exercise, let's use the following:

How can RIT's College of Business increase its enrollment?

2. Decide which of the hats would be a good place to start with for this issue. For example: do you want to bring how you feel about the College's enrollment practices to the surface (red hat)? Figure out what you need to learn about their practices (white hat)? Project the advantages and disadvantages of a decision (yellow and black hats)? Generate new ways for the College to increase enrollment (green hat)?

These first two steps are made using the blue hat - you are deciding what to think about and how to approach the issue.

3. Under the appropriate headings on the following pages, put down at least three items for each hat. You can ask these questions (but are not limited to only these) to help focus your thoughts:

White hat: What facts would help me further in making a decision? How can I get them? (from whom? where?)

Red hat: How do I really feel? What gut feelings do I have about this situation?

Black hat: What are the possible downside risks and problems? What is the worst-case scenario?

Yellow hat: What are all the possible advantages? What would be the best outcome?

Green hat: What completely new, fresh, innovative approaches can I generate. What creative ideas can I dream up to help me the this issue in a new way.

Blue hat: Finally, review your thoughts. Sum up what you've learned from this approach to thinking about this issue and decide what your next step needs to be.

Last four digits of your phone number _____

How can RIT's College of Business increase its enrollment?

White Hat

Red Hat

Last four digits of your phone number _____

How can RIT's College of Business increase its enrollment?

Yellow Hat

Black Hat

Last four digits of your phone number _____

How can RIT's College of Business increase its enrollment?

Green Hat

Blue Hat

Last four digits of your phone number _____

Six Thinking Hats

Directions: Printed below are a series of statements regarding the thinking exercise you just went through. Indicate how much you agree or disagree with the following statements by *circling* the appropriate number. Make your responses based on how you felt **during** the thinking exercise. This information will be very useful to determine how you feel about the "Six Thinking Hats" model and each of the six thinking hats. A summary of the results will be made available to you. Please feel free to respond openly and honestly.

The first set of statements focuses on how you felt about the "Six Thinking Hats" model in general.

Six Thinking Hats Model	STRONGLY DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	STRONGLY AGREE
I liked using the "Six Thinking Hats" model.....	1	2	3	4	5
I felt uneasy using the "Six Thinking Hats" model.....	1	2	3	4	5
The "Six Thinking Hats" model is important for effective thinking.....	1	2	3	4	5
I would like to use the "Six Thinking Hats" model again.....	1	2	3	4	5
The "Six Thinking Hats" model helped me to think better.....	1	2	3	4	5
I was confused about the purpose of the "Six Thinking Hats" model.....	1	2	3	4	5
I was thinking effectively while using the "Six Thinking Hats" model.....	1	2	3	4	5
I am satisfied with the results from using the "Six Thinking Hats" model.....	1	2	3	4	5

Next, would you please indicate on the next few pages how you felt about each of the individual hats used during the thinking exercise. It is helpful to remember that each hat represents a different kind of thinking. Although the statements are similar and appear to be repetitive, your responses may vary. Again, please indicate how much you agree or disagree with each of the statements by *circling* the appropriate number.

White Hat

	STRONGLY DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	STRONGLY AGREE
I liked using the white hat style.....	1	2	3	4	5
I felt uneasy using the white hat.....	1	2	3	4	5
White hat thinking is important for effective thinking.....	1	2	3	4	5
I am satisfied with the results from using the white hat.....	1	2	3	4	5
The white hat helped me to think better.....	1	2	3	4	5
I was confused about the purpose of the white hat.....	1	2	3	4	5
I was thinking effectively while using the white hat.....	1	2	3	4	5

Red Hat

	STRONGLY DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	STRONGLY AGREE
I felt uneasy using the red hat.....	1	2	3	4	5
I liked using the red hat style.....	1	2	3	4	5
Red hat thinking is important for effective thinking.....	1	2	3	4	5
I was confused about the purpose of the red hat.....	1	2	3	4	5
I was thinking effectively while using the red hat.....	1	2	3	4	5
I am satisfied with the results from using the red hat.....	1	2	3	4	5
The red hat helped me to think better.....	1	2	3	4	5

Yellow Hat

	STRONGLY DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	STRONGLY AGREE
I liked using the yellow hat style.....	1	2	3	4	5
I felt uneasy using the yellow hat.....	1	2	3	4	5
The yellow hat helped me to think better.....	1	2	3	4	5
I was confused about the purpose of the yellow hat.....	1	2	3	4	5
I was thinking effectively while using the yellow hat.....	1	2	3	4	5
I am satisfied with the results from using the yellow hat.....	1	2	3	4	5
Yellow hat thinking is important for effective thinking.....	1	2	3	4	5

Black Hat

	STRONGLY DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	STRONGLY AGREE
I liked using the black hat style.....	1	2	3	4	5
I felt uneasy using the black hat.....	1	2	3	4	5
Black hat thinking is important for effective thinking.....	1	2	3	4	5
The black hat helped me to think better.....	1	2	3	4	5
I was thinking effectively while using the black hat.....	1	2	3	4	5
I was confused about the purpose of the black hat.....	1	2	3	4	5
I am satisfied with the results from using the black hat.....	1	2	3	4	5

Green Hat

	STRONGLY DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	STRONGLY AGREE
I felt uneasy using the green hat.....	1	2	3	4	5
I liked using the green hat style.....	1	2	3	4	5
I am satisfied with the results from using the green hat.....	1	2	3	4	5
Green hat thinking is important for effective thinking.....	1	2	3	4	5
I was confused about the purpose of the green hat.....	1	2	3	4	5
The green hat helped me to think better.....	1	2	3	4	5
I was thinking effectively while using the green hat.....	1	2	3	4	5

Blue Hat

	STRONGLY DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	STRONGLY AGREE
I liked using the blue hat style.....	1	2	3	4	5
I felt uneasy using the blue hat.....	1	2	3	4	5
Blue hat thinking is important for effective thinking.....	1	2	3	4	5
I am satisfied with the results from using the blue hat.....	1	2	3	4	5
The blue hat helped me to think better.....	1	2	3	4	5
I was confused about the purpose of the blue hat.....	1	2	3	4	5
I was thinking effectively while using the blue hat.....	1	2	3	4	5

The next few statements relate to thinking in general and the application of the "Six Thinking Hats" concept to your professional career.

	STRONGLY DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	STRONGLY AGREE
Thinking is a skill that can be developed.....	1	2	3	4	5
Applying the "Six Thinking Hats" concept to my career will help me to be more successful.....	1	2	3	4	5
The "Six Thinking Hats" model is too gimmicky to work in a professional work environment.....	1	2	3	4	5
I would like to use the "Six Thinking Hats" concept in group meetings.....	1	2	3	4	5
My ability to think is related to my intelligence.....	1	2	3	4	5

Finally, please respond to the following statements by circling the appropriate category.

Gender..... MALE FEMALE

Before this study, I was familiar with the "Six Thinking Hats" model..... YES NO

My favorite style to think with is the.....

1 WHITE HAT
2 RED HAT
3 YELLOW HAT
4 BLACK HAT
5 GREEN HAT
6 BLUE HAT

(optional) Feel free to write any comments about the "Six Thinking Hats" model and how it relates to your professional career on the back of this page.

Your time and energy is greatly appreciated. Thank you!

Appendix B

ANOVA p-values

	A	B	C	D	E	F	G	H
1		Model	White Hat	Red Hat	Yellow Hat	Black Hat	Green Hat	Blue Hat
2	affective	0.137	0.709	0.637	0.792	0.836	0.406	0.869
3	comfort level	0.327	0.995	0.697	0.84	0.836	0.324	0.965
4	importance	0.128	0.158	0.069	0.205	0.841	0.156	0.275
5	satisfied	0.147	0.738	0.556	0.952	0.751	0.931	0.89
6	helpful	0.087	0.583	0.523	0.456	0.293	0.358	0.402
7	confused	0.651	0.335	0.853	0.78	0.75	0.772	*0.024*
8	per. effect.	0.882	0.65	0.355	0.84	0.747	0.661	0.948
9								
10	use again	0.086						
11								
12								
13								
14	t sk dev	apply car	too gim	lik grp	t & int	gender	fam mod	fav hat
15	0.484	0.222	0.331	0.233	1	0.051	0.731	0.136

Correlations on Argumentative Scale

	A	B	C	D	E	F	G	H
1		Model	White Hat	Red Hat	Yellow Hat	Black Hat	Green Hat	Blue Hat
2	affective	-0.226	-0.155	0.059	-0.057	-0.062	0.229	0.098
3	comfort level	0.0051	0	0	0.063	0.062	-0.217	0.045
4	importance	-0.22	-0.06	-0.38	-0.305	0	-0.114	-0.211
5	satisfied	-0.121	-0.065	-0.066	-0.058	-0.123	0	0
6	helpful	-0.217	-0.132	-0.016	-0.078	-0.072	0.238	-0.123
7	confused	0.156	0.242	0.06	0.073	0	0.135	*0.363*
8	per. effect.	0.004	-0.167	0.248	0.087	-0.138	0.151	-0.061
9								
10	use again	-0.047						
11								
12	aggregate							
13	responses	-0.214	-0.193	-0.106	-0.159	-0.084	0.126	-0.137
14								
15	t sk dev	apply car	too gim	lik grp	t & int	gender	fam mod	fav hat
16	0.051	-0.183	0.236	0	0	0.323	0	-0.093